**NOTICE OF PUBLIC INFORMATION**
**DEPARTMENT OF ENVIRONMENTAL QUALITY**

**1.** **Title and its heading:** Title 49. The Environment
**Chapter and its heading:** Chapter 2. Water Quality Control
**Article and its heading:** Article 2.1. Total Maximum Daily Loads
**Section:** A.R.S. 49-232. Lists of Impaired Waters; data requirements; rules

**2.** **The public information relating to the listed statute:**

Arizona Revised Statute (A.R.S.) 49-232(A) requires the Arizona Department of Environmental Quality (ADEQ) to prepare a list of impaired waters at least once every five years in order to comply with 303(d) of the Clean Water Act [33 U.S.C. 1313(d)]. ADEQ is required to provide public notice and allow for comment on a draft 303(d) list of impaired waters prior to its submission to the United States Environmental Protection Agency (EPA). ADEQ published a draft 303(d) list in a document entitled *Draft 2010 Status of Ambient Water Quality in Arizona 305(b) Assessment and 303(d) Listing Report* (hereafter referred to as the "Integrated Report) and provided an opportunity for public comment on the Integrated Report from January 6, 2012 through April 2, 2012. ADEQ must prepare written responses to public comments received on the draft 303(d) list of impaired waters and publish a summary of ADEQ's responses to comments in the *Arizona Administrative Register*. Finally, ADEQ is required to publish the list of impaired waters that it plans to submit to EPA at least 45 days before submitting the list to EPA.

**3**. **Procedures for challenging an impaired water listing**

The publication of the 303(d) list of impaired waters in the *Arizona Administrative Register* is an appealable agency action. Any party that submitted written comments on ADEQ's draft 2010 303(d) list may challenge a listing of an impaired water by submitting a notice of appeal to the Department in accordance with A.R.S. 41-1092.03. A notice of appeal challenging a listing must be submitted within 45 days of the date of publication of this notice of public information in the *Arizona Administrative Register*. The submission of a timely notice of appeal "stays" ADEQ's initial submission of a challenged listing to EPA. ADEQ may subsequently submit a challenged listing to EPA if the challenged listing is upheld in a final administrative decision by the Director under A.R.S. 41-1092.08 or if the person who challenges a listing withdraws the appeal prior to a final administrative decision by the Director.

**4.** **305(b) and 303(d) of the Clean Water Act**

Section 305(b) of the Clean Water Act requires each state to prepare and submit to EPA a biennial report describing the water quality of all surface waters in the state. Each state must monitor water quality and review available data and information from various sources to determine if surface water quality standards are being met. From this 305(b) water quality assessment report and other sources of information, ADEQ creates the 303(d) list. The 303(d) list identifies Arizona surface waters that do not meet water quality standards. These waters are known as "water quality limited segments" or "impaired waters." Identifying a surface water as impaired may be based on an evaluation of physical, chemical, or biological data demonstrating evidence of a numeric standard exceedance, a narrative standard exceedance, designated use impairment, or a declining trend in water quality, such that the surface water would exceed a water quality standard before the next listing period. ADEQ identifications of impaired waters on the 2010 303(d) list are based on evidence of exceedances of numeric water quality standards.

303(d) of the Clean Water Act requires each state to prepare several lists of surface water segments not meeting surface water quality standards, including those not expected to meet state surface water quality standards after implementation of technology-based controls. The draft 303(d) list is revised based on public input and finalized for submission to EPA. Arizona, like most states, prepares one list containing all of the waters meeting the criteria in section 303(d). At a minimum, ADEQ must consider the following sources of data:

- Surface waters identified in the 305(b) Report, including the 314 lakes assessment that do not meet water quality standards;
- Surface waters for which dilution calculations or predictive models indicate nonattainment of water quality standards;
- Surface waters for which problems have been reported by other agencies, institutions, and the public;
- Surface waters identified as impaired or threatened in the state's non-point assessments submitted to EPA under 319 of the Clean Water Act;
- Fish consumption advisories and restrictions on water sports and recreational contact;
- Reports of fish kills or abnormalities (cancers, lesions, tumors);
- Water quality management plans;
- The Safe Drinking Water Act 1453 source water assessments; and
- Superfund and Resource Conservation and Recovery Act (RCRA) reports and the Toxic Release Inventory.

ADEQ's 303(d) list and supporting documentation are submitted to EPA for review. The ADEQ submission to EPA will contain the 303(d) list, including the pollutants or suspected pollutants impairing water quality; the surface waters targeted for Total Maximum Daily Load (TMDL) development; a priority ranking and schedule for TMDL development; a description of the process used to develop the 303(d) list; the basis for listing decisions, including reasons for not including a surface water or segment on the list; and a summary of ADEQ responses to public comments received on the draft list. 40 CFR 130.7(b)(6)(iv) requires a state to demonstrate "good cause" for not listing a surface water where there are exceedances of water quality standards and places the burden of proof on the state to justify excluding a surface water from the list. "Good cause" factors include more recent or accurate data, flaws in the original analysis, more sophisticated water quality modeling, or changes in the conditions that demonstrate that the surface water is no longer impaired.

The 303(d) list was due to be submitted to the U.S. Environmental Protection Agency on or before April 1, 2010. State law requires that the initial 303(d) list be published in the *Arizona Administrative Register* at least 45 days before the list is submitted to the Regional Administrator. The list of impaired waters that ADEQ plans to submit to EPA is contained in the table titled "Arizona's 2010 303(d) List of Impaired Waters" published in Section 7 of this notice.

EPA has added impaired waters to Arizona's 303(d) list. These EPA listings do not meet the requirements of A.R.S. 49-232 or impaired water identification criteria established in ADEQ's Impaired Water Identification Rules (A.A.C. R18-11-601 through R18-11-606).

**5. Arizona laws governing ADEQ identification of impaired waters and preparation of the 303(d) list**

The Arizona Legislature enacted laws governing ADEQ's development of the 303(d) list in 2000. A.R.S. 49-232(B) requires that ADEQ consider only "reasonably current, credible and scientifically defensible" data that the ADEQ has collected or received from another source in determining whether a water body is an impaired water. The results of water sampling or other assessments of water quality are considered credible and scientifically defensible data only if ADEQ has determined:

1. Appropriate quality assurance and quality control procedures were followed and documented in collecting and analyzing the data;
2. The samples or analyses are representative of water quality conditions at the time the data was collected;
3. The data consists of an adequate number of samples based on the water body in question and the parameters being analyzed; and
4. The method of sampling and analysis, including analytical, statistical and modeling methods, is generally accepted and validated in the scientific community as appropriate for use in assessing the condition of the water.

ADEQ considered reasonable current, credible and scientifically defensible data in preparing 2010 draft 303(d) list. The water quality data and information that ADEQ considered are summarized in the 2010 Integrated Report.

ADEQ is required by A.R.S. 49-232(C) to adopt, by rule, the methodology to be used in identifying waters as impaired. These rules must specify the following:

1. Minimum data requirements and quality assurance and quality control requirements consistent with the requirements of A.R.S. 49-232(B)(1-4).
2. Appropriate sampling, analytical and scientific techniques that may be used in assessing whether a water is impaired.
3. Any statistical or modeling techniques that ADEQ uses to assess or interpret data.
4. Criteria for including and removing waters from the list of impaired waters, including any implementation procedures used for identifying impaired waters on the basis of exceedances of narrative water quality standards.

ADEQ prepared the 2010 Integrated Report in accordance with its Impaired Water Identification Rules (IWIR) that ADEQ adopted in 2002 [*See* A.A.C. R18-11-601 through R18-11-606]. In addition, ADEQ prepared a guidance document that provides additional information on the assessment methods ADEQ uses to identify impaired waters. This guidance document is titled *Surface Water Assessment Methods and Technical Support* (December, 2011)

Under A.R.S. 49-232(D), ADEQ must consider available data in light of the nature of each water body being assessed (including whether a water body is an ephemeral water) when determining whether to include a water body on the 303(d) list of impaired waters.

ADEQ is prohibited by A.R.S. 49-232(F) from listing a water body as an impaired water based on a violation of a narrative or biological water quality standard prior to adopting implementation procedures identifying the objective bases for determining that a violation of the standard exists. None of the waters identified by ADEQ on the 2006/2008 303(d) list are listed because of violations of narrative or biological water quality standards.

**6. ADEQ response to comments on draft 303(d) list**

Arizona's *Draft 2010 Status of Ambient Water Quality in Arizona 305(b) Assessment and 303(d) Listing Report* was given public review from January 6, 2012 through April 2, 2012. Comments received by ADEQ are grouped by the commenter below. ADEQ responses to public comments relating to impaired waters on the 303(d) list are provided in this notice of public information.

**Amigos Bravos/PARA Watchdogs**

Comment #1: 305b/303d Report Schedule Amigos Bravos is concerned that the Draft 2010 Integrated Report is only now being made available for public comment and questions the date range and sources of data used in preparing this and future Integrated Reports..

Response #1- The Draft 2010 Integrated Report is behind schedule as it was due to be completed in April 2010. The recently completed public comment period was the first step in finalizing the 2010 Integrated Report. Responses to comments will be summarized and, along with the 303(d) List, will be published in the *Arizona Administrative Register* for a 45-day Public Notice. Upon completion of the public notice period the 2010 Integrated Report will be submitted to the Environmental Protection Agency Region 9 for approval.

The data used in the Draft 2010 Integrated Report spanned from January 1, 2004 to December 31, 2008. External data that were submitted to ADEQ and met the credible data rule were incorporated into the Draft 2010 Integrated Report. The 2012 Integrated Report is currently being drafted and will include data collected between July 1, 2006 and July 31, 2011. ADEQ are currently soliciting external data that were collected through December 31, 2011 consistent with the new approach of requesting external data annually.

Comment #2- Report is Incomplete Concern was expressed over the fact that the water quality has not been described for all waters of the United States.

Response #2- The commenter is correct that one goal of the 305(b) process is to assess all waters of the United States. However achieving that goal in Arizona where less than 5% of our waters are perennial is problematic. ADEQ continues to focus our ambient monitoring activities on perennial streams and lakes using our limited resources in the most effective and efficient manner. Additional waters are sampled as part of ADEQ special studies or by external entities. As mentioned above ADEQ solicits and includes data, meeting credible data requirements, from external entities for use in the Integrated Report.

Comment #3- Patagonia Lake There is concern that Patagonia Lake was not included in the Draft 2010 Integrated Report.

Response #3- Patagonia Lake was not included in the Draft 2010 Integrated Report as there were no data collected within the data range mentioned in Response #1. Patagonia Lake was included in the 2006/08 Integrated Report as a Category 2 Water (Attaining Some Uses) as the lack of bacteria and some metals data precluded assessment of all uses

Comment #4- Human Health Uses Amigos Bravos requests clarification of the requirements for a water body to become listed as impaired for body contact and other human health issues.

Response #4- The Surface Water Assessment Methods and Technical Support Manual is based upon the Impaired Waters Identification Rule (Arizona Administrative Code, Title 18, Chapter 11, Article 6). The commenter's interpretation is correct that some Human Health criteria require a minimum of 20 samples before a water can be determined to be impaired. However, this requirement does not apply to all human health criteria, specifically *Escherichia coli* and nitrate standards. Impairment determinations are also based upon several other designated use criteria which do not require a minimum of 20 samples including chronic and acute aquatic and wildlife criteria.

Waters can be determined to be attaining all uses when there is "sufficient data to determine that all designated uses are supported". In these assessment units, at least three samples were collected to represent seasonal differences for all core parameters" (Assessment Methods Manual, page 27). Where there is insufficient data to make an attainment or impairment determination the water is assessed as inconclusive and flagged for additional monitoring.

**ASARCO LLC**

General Comment #1- Identify total universe of samples in relevant data analysis period Many of the listings for particular water segments identify all exceedances but do not provide a sense of how many compliant samples exist over the same period. At a minimum, the listings should identify the total number of samples collected during the relevant period as well as the number of exceedances.

Response #1- ADEQ attempted to summarize the total number of samples collected for each parameter within the Monitoring Summary section of each waterbody summary. However, the number of samples collected for each parameter is variable. Therefore, ADEQ presented the number of samples (metals, nutrients and "other") collected as the range of samples collected. Within the exceedances summary some inconsistencies were discovered in the total number of samples collected versus the number of exceedances. Future assessments will present this information in a more consistent manner.

General Comment #2- Additional identification of sample locations and collecting entities Although the individual listing documents identify in a general sense what entities conducted sampling for each impaired stream reach, they do not identify which samples were collected by which entities, or precisely where the samples were collected.

Response #2- ADEQ agrees that the location of sampling sites and exceedances is important information, however, presenting this information succinctly for every result is challenging within the 305(b) Report. The "Site ID#" and "DEQ#" are unique identification numbers used by ADEQ to distinguish one sample site from another and data are linked to these identifiers in ADEQ's Surface Water Quality Database. Data contained is the Surface Water Quality Database and used in assessments is available upon request. ADEQ is exploring the possibility of future assessments being accompanied with a relational database containing all of the data used in that particular assessment. Coupled with interactive GIS maps (see Response #3) future assessments will be more transparent and useful to interested stakeholders.

General Comment #3- Additional information on GIS map available online Although the GIS map maintained by ADEQ on its website to identify impaired waters is helpful, it could be improved.

Response #3- ADEQ is developing additional GIS tools and maps that will be publicly available and include more specific information related to the waters included in the 303(b) Assessment and 303(d) List. These improved tools should be available for use in reviewing the Draft 2012 Integrated Report.

General Comment #4- Use of grab samples to assess compliance with chronic aquatic and wildlife criteria. ASARCO questions the use of grab samples for assessing against chronic water quality standards and suggests using an approach more consistent with Arizona Administrative Code Title 18, Chapter 11, Section 120(c) (A.A.C. R18-11-120).

Response #4- A.A.C. R18-11-120 is entitled "Enforcement" and establishes criteria ADEQ will use to determine compliance and take enforcement action for violations of water quality standards. The rule does not apply to 305(b) water quality assessments or to 303(d) listings of impaired waters. ADEQ adopted a different set of rules, the Impaired Water Identification Rules (R18-11-601 through R18-11-606), which establish how water quality standards are to be used for making 303(d) listing decisions.

Specific Listing Comment #1- Mineral Creek from Devil's Canyon to the Gila River (reach 15050100-012B) The addition of cyanide as an impairment to this reach appears to be incorrect based upon Asarco's review of the data.

Response #1- ADEQ appreciates Asarco providing the Monitoring Data Reports and Laboratory Analytical Results for the samples in question. Based on the corrected data ADEQ agrees that there were no cyanide exceedances and the Mineral Creek (15050100-012B) assessment has been updated to show no cyanide exceedances or impairment. The ADEQ Surface Water Quality Database has also been updated to show that the cyanide results as "Less Than" values.

Specific Listing Comment #2- Gila River from the San Pedro to Mineral Creek (reach 15050100-008) Asarco questions the validity of the SSC impairment for this reach of the Gila River based on the data included in the draft 2010 Integrated Report.

Response #2- The Gila River (150502100-008) was listed as impaired in the 2006/08 Assessment. In order to delist this segment sufficient data is needed to show that the standard is now being attained. In the Draft 2010 Integrated Report only one data point was collected under conditions when the standard can be applied. No median values could be calculated for comparison with the applicable surface water quality standard. Therefore, the reach remains impaired.

**BHP Copper Inc.**

Comment #1- Proposed 303 (d) listing of Pinto Creek (15060103-018B) for total selenium It is not clear that listing is appropriate based on the data provided by ADEQ. At least one sample may not have been representative of surface water but rather of upwelling groundwater, and it is not clear that the remaining samples were taken under stable conditions. The same data was previously found to be insufficient to justify and impairment listing. In the absence of additional data, it is not clear why ADEQ is now proposing this listing.

Response #1- After reviewing the two total selenium exceedances noted in the 2006/08 and Draft 2010 Assessments ADEQ agrees that the reach is not impaired based on the existing data. The two 3 ug/L results in question were observed on 10/18/04 (ADEQ# 103313) and 2/4/04 (ADEQ# 102431) by BHP Copper Inc. as part of their ambient monitoring program. On both of these dates the measured flows were 0.06 and 0.04 cfs, respectively. The discharge rate for these samples is approximately an order of magnitude lower than the average discharge value for the reach of Pinto Creek. The low discharge rate was used as the basis for not counting these values as exceedances in the 2006/08 Assessment. That same rationale will be used in the Draft 2010 Assessment and the impairment decision will be revised accordingly. However, it should be noted that low flow is not typically used to disqualify metals data from being used in making assessment determinations.

Comment #2- Continued Not Attaining Status of Pinto Creek (15060103-018B and 018C) Several segments of Pinto Creek are listed as "Category 4A, Not Attaining" for copper. However, based on the additional assessment work completed by ADEQ after the initial TMDL that indicated high natural background levels of copper in the watershed (and the need for a site specific standard), and Arizona's TMDL statute, it appears that it is not appropriate to continue to list Pinto Creek as impaired for copper.

Response #2- EPA R9 completed the Pinto Creek Copper TMDL in 2001 and ADEQ is developing a site specific dissolved copper standard for Pinto Creek. ADEQ agrees that where natural background conditions *alone* exceed water quality standards, a surface water would not be listed as impaired (A.R.S. 49-232(D)). However, there are clearly defined anthropogenic sources located within the Pinto Creek watershed that cause exceedances of both the current default and proposed site specific dissolved copper water quality standards. Therefore, ADEQ believes is it justified in continuing to list Pinto Creek in Category 4A for dissolved copper.

**Franciscan Friars of California**

Comment #1- Proposed 303 (d) listing of Pinto Creek (15060103-018B) for total selenium It is not clear that listing is appropriate based on the data provided by ADEQ. At least one sample may not have been representative of surface water but rather of upwelling groundwater, and it is not clear that the remaining samples were taken under stable conditions. The same data was previously found to be insufficient to justify and impairment listing. In the absence of additional data, it is not clear why ADEQ is now proposing this listing.

Response #1- After reviewing the two total selenium exceedances noted in the 2006/08 and Draft 2010 Assessments ADEQ agrees that the reach is not impaired based on the existing data. The two 3 ug/L results in question were observed on 10/18/04 (ADEQ# 103313) and 2/4/04 (ADEQ# 102431) by BHP Copper Inc. as part of their ambient monitoring program. On both of these dates the measured flows were 0.06 and 0.04 cfs, respectively. The discharge rate for these samples is approximately an order of magnitude lower than the average discharge value for the reach of Pinto Creek. The low discharge rate was used as the basis for not counting these values as exceedances in the 2006/08 Assessment. That same rationale will be used in the Draft 2010 Assessment and the impairment decision will be revised accordingly. However, it should be noted that low flow is not typically used to disqualify metals data from being used in making assessment determinations.

Comment #2- Continued Not Attaining Status of Pinto Creek (15060103-018B and 018C) Several segments of Pinto Creek are listed as "Category 4A, Not Attaining" for copper. However, based on the additional assessment work completed by ADEQ after the initial TMDL that indicated high natural background levels of copper in the watershed (and the need for a site specific standard), and Arizona's TMDL statute, it appears that it is not appropriate to continue to list Pinto Creek as impaired for copper.

Response #2- EPA R9 completed the Pinto Creek Copper TMDL in 2001 and ADEQ is developing a site specific dissolved copper standard for Pinto Creek. ADEQ agrees that where natural background conditions *alone* exceed water quality standards, a surface water would not be listed as impaired (A.R.S. 49-232(D)). However, there are clearly defined anthropogenic sources located within the Pinto Creek watershed that cause exceedances of both the current default and proposed site specific dissolved copper water quality standards. Therefore, ADEQ believes is it justified in continuing to list Pinto Creek in Category 4A for dissolved copper.

**Freeport McMoRan Corporation (FMC)**

**Comments on Surface Water Assessment Methods and Technical Support**

Methods Comment #1- Availability of All Data and Including the "Contextual" Information Used in the Assessment Process. ADEQ should consider making all information and data used in the assessment process, including all analytical data and "contextual" data, available for public review.

Methods Response #1- ADEQ is exploring the possibility of future assessments being accompanied with a relational database containing all of the data used on that particular assessment. Coupled with interactive GIS maps future assessments will be more transparent and useful to the reader. Although the database was not available for this assessment, data were provided upon request.

Methods Comment #2- Assessment of Ephemeral Drainages. Given the inherent nature of ephemeral drainages, data collected from such drainages is not reproducible and not necessarily representative of overall watershed conditions. ADEQ should eliminate assessment efforts of ephemeral drainages.

Methods Response #2- ADEQ assesses credible data from waterbodies that have applicable water quality standards. Ephemeral standards are expressed in Arizona Administrative Code (A.A.C.) Title 18 Chapter 11 and, therefore, making 305(b) and 303(d) determinations based upon those standards are justified and required in accordance with state and federal regulations.

Methods Comment #3- Flow Regime Determination for Use in Designated Use Assignments. When it is not clear whether a tributary is intermittent or ephemeral and there is an absence of actual specific analysis, a determination of ephemeral is more appropriate, especially when assessment units have limited drainage basins, lack evidence of groundwater interaction, and there is not a clear and recognizable riparian zone.

Methods Response #3- The Tributary Rule (A.A.C. R-18-11-105) is used to determine which standards are applied to a waterbody not listed in Appendix B of A.A.C. R-18-11. ADEQ uses all available data and contextual information in determining whether these waters have ephemeral or intermittent flow regimes.

Methods Comment #4- Consideration and Establishment of Natural Background Conditions. The process ADEQ uses for assessing natural background, or such references, is not included in the Assessment Methods document. FMC feels that natural background conditions should be given greater consideration as part of the assessment process, prior to impairment listing and TMDL development, and that such conditions have been inaccurately quantified in the past.

Methods Response #4- When making data comparisons during the assessment process sample location and contextual information is evaluated. Samples collected below anthropogenic discharges, disturbances or activities are not considered as representing natural conditions. Data known to have been collected above or in areas not affected by anthropogenic sources are considered to represent background conditions and any exceedances of the applicable water quality standard are not included in making impairment determinations.

Methods Comment #5- Reporting and Assessment of Flow Conditions. ADEQ should consider a more consistent quantitative assessment of flow conditions rather than reliance on field observations and qualitative assessments of storm events when USGS gauging stations are not present.

Methods Response #5- The comment discusses Sections 3 and 5 of the Assessment Methods document and their relation to accounting for flow conditions when collecting and assessing surface water quality data. ADEQ ambient and TMDL programs measure discharge when collecting surface water quality samples in accordance with the ADEQ *Standard Operating Procedures for Surface Water Quality Sampling.* If discharge measurements are not taken the reason for deviation from the standard operating procedures is noted in the Surface Water Quality Database. These data, either numeric discharge values or contextual observations, are used in subsequent assessment determinations.

Discharge data are not included in the assessment for all samples collected. ADEQ only includes discharge measurements in the data summary when it is necessary to support using or excluding data in making assessment determinations. These data would be included in any future publicly available assessment database, see Methods Response #1.

The “if documented” questioned on page 17 of the Assessment Methods refers to data collected by external entities. Flow or discharge rate is not a requirement for ADEQ acceptance of external data for use in the assessment process. Outside sources collect data for a variety of reasons and determine which measurements are needed to fulfill their data needs. Where possible and necessary ADEQ uses nearby USGS gauges to supply average daily flow values where discharge data are lacking.

Methods Comment #6- Determination and Field Assessment of Critical Conditions. Considering critical conditions are frequently based on flow, verification of critical conditions in the field may not be possible. ADEQ should also consider including as part of the Assessment Methods document how critical conditions are determined.

Methods Response #6- Section 3 of the Assessment Methods document refers to critical conditions and how these are related to making assessment determinations. Critical conditions refer to the conditions under which exceedances have previously been observed. Although critical conditions are established when developing a TMDL, they can be based upon the analysis of prior monitoring data. As an example, if previous exceedances or impairment determinations were measured under low flow conditions then subsequent data would need to be collected under low flow conditions in order to show that standards are now being attained.

When conducting follow up or effectiveness monitoring ADEQ staff are aware of the critical condition and target sampling accordingly.

Methods Comment #7- Data Representativeness of Sustained and Chronic Conditions under the Current ADEQ Assessment Approach.

Comment 7a) Individual grab samples are likely not representative of chronic exposure conditions, first as a result of the difficulty in estimating flow conditions, but more importantly such samples do not capture the natural variability of contaminant concentrations over time, even during sustained flows, see attached United State Geological Survey report.. ADEQ should implement an alternative sampling approach that is more representative of the actual chronic exposure conditions and more consistent with Arizona's surface water quality standards (*see* R18-11-120(C).

Methods Response 7a) A.A.C. R18-11-120 is entitled "Enforcement" and establishes criteria ADEQ will use to determine compliance and take enforcement action for violations of water quality standards. The rule does not apply to 305(b) water quality assessments or to 303(d) listings of impaired waters. ADEQ adopted a different set of rules, the Impaired Water Identification Rules (R18-11-601 through R18-11-606), which establish how water quality standards are to be used for making 303(d) listing decisions.

ADEQ is aware of the 2003 USGS "Diurnal Variation in Trace-Metal Concentrations in Streams" Fact Sheet. However, it should be noted that on page 2 it stats "These types of diurnal metal cycles have not been observed in acidic streams more directly affected by mine drainage". In several parts of the state, including Mule Gulch, pH exceedances and impairments coincide with metals impairments.

Comment 7b) ADEQ should adopt a different approach to chronic exposure assessment that accounts for sample size given that flow conditions and natural metals variability may not be accurately reflected in the data collected.

Methods Response #7b- ADEQ evaluated contextual information where there were two or more exceedances of chronic A&W standards and sufficient grounds existed for including a water body on the 303(d) list. ADEQ's use of grab sample results to assess attainment of chronic aquatic and wildlife standards and ADEQ's use of contextual information to determine whether stable conditions existed at the time of sampling is consistent with EPA guidance and the Assessment Methods document.

**Comments on 2010 Status of Water Quality- Arizona's Integrated 305(b) Assessment and 303(d) Listing Report (Draft 2010 Report)**

Chapter 2 Comment #1- Bill Williams Watershed Water Quality Assessments – General Observations FMC questions why ephemeral drainages were targeted in 2004 and the applicability of the SSC standard.

Chapter 2 Response #1- ADEQ did conduct an intensive sampling program within the Bill Williams Watershed beginning in 2003 in support the Alamo Lake Mercury TMDL. Unlike the ADEQ ambient monitoring program, TMDL development necessitates a targeted monitoring approach to determine pollutant sources and loading. Ephemeral drainages were targeted to determine their potential as sources of mercury within the larger watershed. Although SSC was a targeted parameter it was not used in assessing ephemeral drainages. ADEQ reviewed the draft Bill Williams Watershed Assessment and could not find an instance where the SSC standard was applied to an ephemeral drainage. Where applicable, SSC data were assessed in the draft 2010 Integrated Report however storm flow related exceedances were noted but not used in making assessment determinations.

Chapter 2 Comment #2- Bill Williams Watershed Water Quality Assessments (p. 15 – Boulder Creek (Wilder Creek to Butte Creek)) FMC questions why the segment of Boulder Creek remains not attaining based upon 1 dissolved copper exceedances.

Chapter 2 Response #2- The Assessment Methods document states that in order to delist a chronic impairment that parameter of concern was sampled and there were no exceedances during the assessment period. In this instance dissolved copper was collected and results show an exceedance of the applicable surface water quality standard, therefore the decision to keep the reach in Category 4 is justified.

Historic water quality exceedances for beryllium, manganese and pH were consistently measured near the Hillside Mine adit discharge. The recent monitoring data, although located within the same reach as the adit discharge, were not collected at the same site as previous exceedances. The Draft 2010 Integrated Report has been revised to state that critical sites have not been sampled rather than the results were not collected under critical conditions. ADEQ believes that this approach is consistent with A.A.C. R18-11-605(E)(ii).

Chapter 2 Comment #3- Bill Williams Watershed Water Quality Assessments (p. 22 – Bridle Creek (Headwaters to Santa Maria River)) FMC is concerned that the designated uses applied to Bridle Creek are not accurate.

Chapter 2 Response #3- Bridle Creek was assigned Aquatic and Wildlife warmwater, Full Body Contact and Fish Consumption designated uses based upon R18-11-105(3) and observed intermittent flows near US Route 93 and State Route 96. ADEQ is willing to discuss revising the designated uses of Bridle Creek for use in future assessments based upon additional information supplied by FMC.

Chapter 2 Comment #4- Bill Williams Watershed Water Quality Assessments (p. 25 – Burro Creek (Francis Creek to Boulder Creek)) FMC is concerned that the incorrect dissolved cadmium standard was applied.

Chapter 2 Response #4- FMC is correct that the incorrect dissolved cadmium standard was applied to the 12/4/2007 sample. In the 2009 Triennial Review of Surface Water Quality Standards ADEQ proposed revising the Aquatic and Wildlife warmwater chronic dissolved cadmium standards but the revision was not approved by EPA. The draft 2010 Assessment of Burro Creek incorrectly applied the proposed cadmium standard rather than the approved standard. Based upon the existing standard, the cadmium exceedance has been removed from this reach.

Chapter 2 Comment #5- Bill Williams Watershed Water Quality Assessments (p. 26 – Butte Creek (Headwaters to Burro Creek (should be Boulder Creek)) FMC is concerned that the designated uses assigned to Butte Creek are incorrect.

Chapter 2 Response #5- Butte Creek was assigned Aquatic and Wildlife warmwater, Full Body Contact and Fish Consumption designated uses based upon R18-11-105(3). FMC previously provided ADEQ with monitoring data which include 18 sample dates ranging from 1999-2007. Although the sample dates varied year to year all samples appear to have been collected from November through April. The ability to sample consistently during this time span indicate that there is intermittent flow during these months justifying the assignment of the above mentioned designated uses. The correct reach description has been incorporated into the draft assessment.

Chapter 2 Comment #6- Bill Williams Watershed Water Quality Assessments (p. 33 – Mountain Spring Wash (Headwaters to Bridle Creek)) FMC questions why ADEQ appears to be targeting its limited resources for sampling ephemeral waters when developing TMDLs.

Chapter 2 Response #6- See Chapter 2 Response #1

Chapter 2 Comment #7- Bill Williams Watershed Water Quality Assessments (p. 37 – Santa Maria River (Little Sycamore Creek to Little Shipp Wash)) FMC is concerned that the dissolved chronic mercury exceedances where not collected under stable conditions.

Chapter 2 Response #7- ADEQ has reviewed the dissolved mercury and associated SSC data that were used in the original 303(d) listing of this reach and agrees that the mercury exceedances did not occur under stable conditions. Therefore this reach is no longer impaired for dissolved mercury and is assessed as inconclusive.

Chapter 2 Comment #8- Salt River Watershed Water Quality Assessments (p. 51 – Pinal Creek (Lower Pinal Creek WTP Discharge)) The December 8, 2004 dissolved chromium exceedance listed in the draft report should be removed. The chromium data collected on that date is suspect as the dissolved fraction is greater than the total fraction.

Chapter 2 Response #8- ADEQ agrees and had removed the exceedances from the draft report. The chromium results from 12/8/04 have been removed from the ADEQ Surface Water Quality Database and will not be used in future assessments.

Chapter 2 Comment #9- San Pedro Watershed Water Quality Assessment (pp. 11, 20-22 – Mule Gulch & Brewery Gulch) Based on the ADEQ finding that natural conditions alone would cause the default standards applicable to Mule Gulch and Brewery Gulch to be exceeded, FMC respectfully requests that Mule Gulch and Brewery Gulch not be listed as impaired until after appropriate site-specific standards have been developed and the creeks reassessed under the appropriate standards.

Chapter 2 Response #9- ADEQ agrees that where natural background conditions alone exceed water quality standards, a surface water would not be listed as impaired (A.R.S. 49-232(D)). However, there are potential anthropogenic sources located within the Mule Gulch watershed that contribute to exceedances of the current dissolved copper water quality standards. Therefore, ADEQ believes is it justified in continuing to list Mule Gulch and Brewery Gulch as impaired for dissolved copper.

The development of a site specific standard for Mule Gulch is ongoing; however, ADEQ has not determined the appropriate standard or the extent of Mule Gulch to which the standard will apply.

Appendix G – Bioassessment Results for Perennial, Wadeable Streams FMC questions why Appendix G is included in the Draft 2010 Report. Absent appropriate implementation procedures, the information in Appendix G is premature and misleading and should be moved from the report. If ADEQ decides to keep this information in the report, it should revise the information consistent with the following: clarify in the report its stated position that it does not support any listing of waters based on Arizona's narrative bioassessment criteria due to the need for implementation procedures; remove any reference in the appendix text, figures, and Appendix 1 to any potential violations or assessment determinations relating to past bioassessment results; and if Appendix G and the information in Appendix 1 is retained, the appendix should be revised to report that ADEQ evaluated data collected in the Fall of 2008.

Appendix G Response- Although Narrative Biological Criteria for Wadeable, Perennial Streams (biocritieria) were adopted in 2009 the Implementation Procedures have not been finalized. ADEQ agrees that it cannot list any waters as impaired for biocriteria until the Implementation Procedures have been adopted. Appendix G was included in the 2010 Assessment as a summary of data collected to support the development of the standard. Data collected within the 2010 assessment time frame (1/1/04-12/31/08) for individual stream segments were also included in the data summaries to inform the reader of available biocriteria data.

ADEQ will clarify the language in Appendix G to make it clear that no assessment determinations have been made using the biocriteria water quality standard. The last sentence of the first paragraph of Appendix B will be removed. Additionally, any reference to Biocriteria Implementation Procedures will be preceded by "draft". ADEQ intends to engage stakeholders in mid 2012 in finalizing the draft Biocriteria Implementation Procedures developed in support of the 2009 Narrative Biological Criteria for Wadeable, Perennial Streams.

ADEQ will remove the "inconclusive" determinations listed in Appendix B as these may be interpreted that ADEQ made an assessment determination based upon biocriteria. The data summarized in Appendix 1 (renamed Data Summary) of Appendix G only included data collected through June 30, 2008. The fall 2008 data were not included in Appendix 1 (Data Summary) because the biocriteria standard is defined for "the spring index period" only and does not apply to fall samples at this time. ADEQ collected the fall 2008 sample as part of an ongoing comparison

study to examine the feasibility of using the spring IBI for fall samples. ADEQ will also change the column heading from "Assessment Category" to "Standards Determination" in Appendix 1 (Data Summary) of Appendix G.

Appendix H – Bottom Deposits Assessment FMC questions why Appendix H is included in the Draft 2010 Report. Absent appropriate implementation procedures, the information in Appendix H is premature and misleading and should be moved from the report. If ADEQ decides to keep this information in the report, it should revise the information consistent with the following: clarify in the report its stated position that it does not support any listing of waters based on Arizona's bottom deposits criteria due to the need for appropriate implementation procedures; remove any reference in the appendix text, figures, and Appendix 1 to any potential violations or assessment determinations relating to past bottom deposit results; and incorporate external bottom deposit data into future assessments

Appendix H- Response- Although Narrative Bottom Deposit Criteria for Wadeable, Perennial Streams (bottom deposits) were adopted in 2009 the Implementation Procedures have not been finalized. ADEQ agrees that it cannot list any waters as impaired for bottom deposits until the Implementation Procedures have been adopted. Appendix H was included in the 2010 Assessment as a summary of data collected to support the development of the standard. Data collected within the 2010 assessment time frame (1/1/04-12/31/08) for individual stream segments were also included in the data summaries to inform the reader of available bottom deposit data.

ADEQ will clarify the language in Appendix H to make it clear that no assessment determinations have been made using the bottom deposit water quality standard. Additionally, any reference to Bottom Deposit Implementation Procedures will be preceded by "draft". ADEQ intends to engage stakeholders in mid 2012 in finalizing the draft Bottom Deposit Implementation Procedures developed in support of the 2009 Narrative Bottom Deposit Criteria for Wadeable, Perennial Streams.

ADEQ will change the column heading from "Assessment Category" to "Standards Determination" in Appendix 1 (renamed Data Summary) of Appendix H.

ADEQ anticipates incorporating Pinal Creek Group water quality and bottom deposit data in future assessments.

**KGHM International Ltd- Carlota Copper Company**

Comment #1- Proposed listing of Haunted Canyon While considering the same data (i.e. sampling data from March 10, 2004 and December 30, 2004) provided in the Draft 2010 Report for Haunted Canyon, the final 06/08 WQAR specifically found that weight-of-evidence surrounding the data did not support listing Haunted Canyon as impaired. The same assessment finding made in the final 06/08 WQAR should be made in the Draft 2010 Report.

Response #1- ADEQ reviewed the 2006/08 Integrated Report and the analysis used in determining that the 17 ug/L result, collected 3/10/2004, and agrees that the result should not be used in making assessment determinations. ADEQ will not count the 3/10/2004 result as an exceedance. The Draft 2010 305 (b) Assessment and 303(d) List will be revised to indicate that Haunted Canyon is not impaired for dissolved copper.

Comment #2- Continued Not Attaining Status of Pinto Creek (15060103-018B and 018C) Based on the ADEQ finding that natural conditions alone would cause the default standards applicable to Pinto Creek to be exceeded, Pinto Creek should not be listed as impaired until after appropriate site-specific standards are developed for Pinto Creek.

Response #2- EPA R9 completed the Pinto Creek Copper TMDL in 2001 and ADEQ is developing a site specific dissolved copper standard for Pinto Creek. ADEQ agrees that where natural background conditions *alone* exceed water quality standards, a surface water would not be listed as impaired (A.R.S. 49-232(D)). However, there are clearly defined anthropogenic sources located within the Pinto Creek watershed that cause exceedances of both the current default and proposed site specific dissolved copper water quality standards. Therefore, ADEQ believes is it justified in continuing to list Pinto Creek in Category 4A for dissolved copper.

Comment #3- Proposed 303 (d) listing of Pinto Creek (15060103-018B) for total selenium With respect to selenium, the 2006/08 Integrated Report states that there was only one exceedance and that the selenium samples collected on

2/4/04 and 10/18/04 was due to groundwater upwelling. For some reason, the draft 2010 report proposes to list this segment of Pinto Creek as impaired using the exact same data.

Response #3- After reviewing the two total selenium exceedances noted in the 2006/08 and Draft 2010 Assessments ADEQ agrees that the reach is not impaired based on the existing data. The two 3 ug/L results in question were observed on 10/18/04 (ADEQ# 103313) and 2/4/04 (ADEQ# 102431) by BHP Copper Inc. as part of their ambient monitoring program. On both of these dates the measured flows were 0.06 and 0.04 cfs, respectively. The discharge rate for these samples is approximately an order of magnitude lower than the average discharge value for the reach of Pinto Creek. The low discharge rate was used as the basis for not counting these values as exceedances in the 2006/08 Assessment. That same rationale will be used in the Draft 2010 Assessment and the impairment decision will be revised accordingly. However, it should be noted that low flow is not typically used to disqualify metals data from being used in making assessment determinations.

**Pima County Regional Wastewater Reclamation Department (RWRD)**

Comment #1- Proposed Not Attaining Status of Santa Cruz River Pima County RWRD routinely collects surface water quality samples from the Santa Cruz River within the Canada del Oro to the HUC 15030303 Boundary. These data were shared with ADEQ and used on the draft 2010 Integrated Report. Upon reviewing the draft Assessment RWRD discovered that some contextual information was not included with the data submission. Several metal exceedances listed in the draft assessment were collected during storm events. In light of this additional information RWRD requests that ADEQ reassess this reach of the Santa Cruz River.

Response #1- As noted, Pima County provided additional flow related information for samples collected on July 29th, August 6th and December 8th, 2004. Based upon the reevaluation of the data, based on the contextual storm flow data, the proposed "not attaining" determination for dissolved mercury has been removed as both exceedances were collected during storm events and not representative of chronic conditions. The dissolved lead and copper exceedances measured on July 29, 2004 both exceeded the acute Aquatic and Wildlife ephemeral standards and will be noted as such in the revised draft assessment. The December 8, 2004 dissolved copper was measured during elevated flows and therefore will not be counted as a chronic exceedance. Dissolved copper will be assessed as inconclusive based upon one acute and chronic exceedance.

**Resolution Copper Company**

Comment #1- Hardness Dependent Standards Copper has a hardness dependent A&Ww standard. If multiple samples are collected from a runoff event, the ADEQ presumably compares the maximum copper concentration to the acute standard and the median concentration to the chronic standard. However, for some of the sampling events on Arnett Creek (15050100-1818) and Queen Creek (15050100-014A), it is unclear exactly which hardness value(s) the ADEQ used to calculate the A&Ww standard for copper. RCML is also unclear as to why only one hardness standard is listed for both acute and chronic standards at one site. RCML also requests clarification as to which sample fractions (total, total recoverable or dissolved) were used to calculate the hardness dependent standards.

Response #1- RCML is correct that when multiple samples are collected within a 7 day period they are aggregated using the "7-Day Rule" as outlined in the Assessment Technical Manual. The hardness value corresponding to the maximum copper result is used to calculate the acute standard and the hardness value corresponding to the median copper result is used to calculate the chronic copper standard. If only one sample was collected within 7 days no aggregation is required, a single hardness value is used to calculate both the applicable acute and chronic standards. An example is shown when reviewing the data for Arnett Creek (15050100-1818). The applicable standards for August 7, 2007 were calculated using different hardness values as discussed above. This indicates that multiple samples (4 samples) were collected on this date compared to December 8, 2007 where only one sample was collected resulting in a single hardness value. ADEQ will update the Assessment Technical Manual to reflect this approach to determining the appropriate hardness value to use when determining the applicable dissolved copper standard.

There are several, widely accepted methods for determining hardness values. ADEQ calculates total hardness based upon total calcium and magnesium results using ASTM Method 2340B. When determining the applicable hardness

dependent standard during the assessment process, total calculated hardness is used when available. However, if a total calculated hardness value is not available in a particular dataset, other credible hardness values are used to determine the applicable hardness dependent standard if available.

Comment #2- Fluoride The 2010 Draft Assessment applies a FBC fluoride standard of 84mg/L rather that the 140mg/L as stated in the Arizona Administrative Code

Response #2- RCML is correct that the old Full Body Contact (FBC) fluoride standard (84 mg/L) was applied to Arnett Creek (15050100-1818) during the assessment. The Draft 2010 Integrated Report has been updated to reflect the current FBC standard which is 140 mg/L which reduces the number of exceedances to one. Arnett Creek will remain inconclusive for FBC.

Comment #3- Location of newly listed reaches in the Queen Creek Watershed RCML was not able to locate the three newly 303(d) listed unnamed tributaries to Queen Creek on the maps provided with the Draft 2010 Integrated Report.

Response #3- ADEQ apologizes for the Middle Gila Watershed maps not providing enough detail to see the newly listed reaches in the Queen Creek Watershed. ADEQ is developing an interactive GIS application that will provide interested stakeholders with additional resources with which to examine future assessments.

## 7. Arizona's 2010 303(d) List of Impaired Waters

This list contains assessment units that were assessed as impaired (Category 5) by ADEQ or EPA during the current and previous assessment listing cycles. The year each parameter was listed is located in parentheses after each parameter (2010 listings are in **bold**).

| Assessment Unit | Size (acres/miles) | Cause(s) of Impairment (year first listed) |
|---|---|---|
| **Bill Williams Watershed** | | |
| Alamo Lake<br>15030204-0040 | 1414 a | Ammonia (2004), mercury in fish tissue (2002- EPA), high pH (1996) |
| Bill Williams River<br>Alamo Lake to Castaneda Wash<br>15030204-003 | 35.9 mi | Ammonia and high pH (2006) |
| Boulder Creek<br>Tributary at 344114/1131800 to Wilder Creek<br>15030202-006B | 14.4 mi | Beryllium (dissolved)<br>(**2010**) |
| Coors Lake<br>15030202-5000 | 230 a | Mercury in fish tissue (2004- EPA) |
| **Colorado-Grand Canyon Watershed** | | |
| Colorado River<br>Lake Powell to Paria River<br>14070006-001 | 16.3 mi | Selenium (total) (2006) |
| Colorado River<br>Parashant Canyon to Diamond Creek<br>15010002-003 | 27.6 mi | Selenium (total) and suspended sediment concentration (2004) |
| Paria River<br>Utah border to Colorado River<br>14070007-123 | 29.4 mi | Suspended sediment concentration (2004), *E. coli* (2006) |
| Virgin River<br>Beaver Dam Wash to Big Bend Wash<br>15010010-003 | 10.1 mi | Selenium (total) and suspended sediment concentration (2004), *E. coli* (**2010**) |
| **Colorado-Lower Gila Watershed** | | |
| Colorado River<br>Hoover Dam to Lake Mohave<br>15030101-015 | 40.4 mi | Selenium (total) (2004) |
| Colorado River<br>Bill Williams River to Osborne Wash<br>15030104-020 | 13.4 mi | Selenium (total) (**2010**) |
| Colorado River<br>Main Canal to Mexico border<br>15030107-001 | 32.2 mi | Low dissolved oxygen and selenium (total) (2006) |

| Assessment Unit | Size (acres/miles) | Cause(s) of Impairment (year first listed) |
|---|---|---|
| Colorado River<br>Imperial Dam to Gila River<br>15030107-003 | 15.3 mi | Selenium (total) (**2010**) |
| Gila River<br>Coyote Wash to Fortuna Wash<br>15070201-003 | 28.3 mi | Selenium (total) and boron (total) (2004) |
| Lake Mohave<br>15030101-0960 | 27044 a | Selenium (total) (**2010**) |
| Painted Rock Borrow Pit Lake<br>15070201-1010 | 186 a | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA), low dissolved oxygen (1992) |
| **Little Colorado Watershed** | | |
| Bear Canyon Lake<br>15020008-0130 | 55 a | Low pH (2004- EPA) |
| Black Canyon Lake<br>15020010-0180 | 37.4 a | Ammonia (**2010**) |
| Little Colorado River<br>Silver Creek to Carr Wash<br>15020002-004 | 6.1 mi | *E. coli* (2004), suspended sediment concentration (2006) |
| Lyman Lake<br>15020001-0850 | 1308 a | Mercury in fish tissue (2004- EPA) |
| Pintail Lake<br>15020005-5000 | 25.7 a | Ammonia (**2010**) |
| Puerco River<br>Dead Wash to Ninemile Wash<br>15020007-007 | 0.2 mi | Copper (dissolved) (**2010**) |
| Telephone Lake<br>15020005-1500 | 22.3 a | Ammonia (**2010**) |
| **Middle Gila Watershed** | | |
| Agua Fria River<br>Sycamore Creek to Big Bug Creek<br>15070102-023 | 9.1 mi | *E. coli* (**2010**) |
| Alvord Lake<br>15060106B-0050 | 27 a | Ammonia (2004) |
| Arnett Creek<br>Headwaters to Queen Creek<br>15050100-1818 | 11.1 mi | Copper (dissolved) (**2010**) |
| Chaparral Park Lake<br>15060106B-0300 | 12 a | Low dissolved oxygen and *E. coli* (2004) |
| Cortez Park Lake<br>15060106B-0410 | 2 a | Low dissolved oxygen and high pH (2004) |
| Gila River<br>San Pedro River to Mineral Cr.<br>15050100-008 | 19.8 mi | Suspended sediment concentration (2006) |
| Gila River<br>Salt River - Agua Fria River<br>15070101-015 | 3.7 mi | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |
| Gila River<br>Agua Fria River - Waterman Wash<br>15070101-014 | 11.9 mi | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |
| Gila River<br>Waterman Wash - Hassayampa River<br>15070101-010 | 13.9 mi | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |
| Gila River<br>Hassayampa River - Centennial Wash<br>15070101-009 | 7.0 mi | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |
| Gila River<br>Centennial Wash - Gillespie Dam<br>15070101-008 | 5.3 mi | Selenium (total) (2004), DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA), boron (total) (1992) |
| Gila River<br>Gillespie Dam - Rainbow Wash<br>15070101-007 | 5.1 mi | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |
| Gila River<br>Rainbow Wash - Sand Tank<br>15070101-005 | 16.9 mi | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |

| Assessment Unit | Size (acres/miles) | Cause(s) of Impairment (year first listed) |
|---|---|---|
| Gila River<br>Sand Tank - Painted Rocks Reservoir<br>15070101-001 | 18.7 mi | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |
| Hassayampa River<br>Buckeye Canal – Gila River<br>15070103-001B | 2.3 mi | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |
| Lake Pleasant<br>15070102-1100 | 8000 a | Mercury in fish tissue (2006- EPA) |
| Mineral Creek<br>Devil's Canyon to Gila River<br>15050100-012B | 19.6 mi | Copper (dissolved) (1992), selenium (total) (2004), low dissolved oxygen (2006) |
| Painted Rocks Reservoir<br>15070101-1020A | 100 a | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |
| Queen Creek<br>Headwaters to Superior WWTP discharge<br>15050100-014A | 8.8 mi | Copper (dissolved) (2002), lead (total) (**2010**) |
| Queen Creek<br>Superior WWTP discharge to Potts Canyon<br>15050100-014B | 5.9 mi | Copper (dissolved) (2004) |
| Queen Creek<br>Potts Canyon to Whitlow Canyon<br>15050100-014C | 8.0 mi | Copper (dissolved) (**2010**) |
| Salt River<br>23rd Ave WWTP - Gila River<br>15060106B-001D | 14.1 mi | DDT metabolites, toxaphene and chlordane in fish tissue (2002- EPA) |
| Tributary to Queen Creek<br>Headwaters to Queen Creek<br>15050100-991 | 2.0 mi | Copper (dissolved) (**2010**) |
| Unnamed Tributary to Queen Creek<br>Headwaters to Queen Creek<br>15050100-1843 | 1.7 mi | Copper (dissolved) (**2010**) |
| Unnamed Tributary to Queen Creek<br>Headwaters to Queen Creek<br>15050100-1000 | 0.5 mi | Copper (dissolved) (**2010**) |
| **Salt Watershed** | | |
| Apache Lake<br>15060106A-0070 | 2,190 a | Low dissolved oxygen<br>(2006) |
| Canyon Lake<br>15060106A-0250 | 450 a | Low dissolved oxygen<br>(2004) |
| Christopher Creek<br>Headwaters to Tonto Creek<br>15060105-353<br>*Also on Not Attaining (4A) List | 8 mi | Phosphorus (2006) |
| Crescent Lake<br>15060101-0420 | 157 a | High pH (2002- EPA) |
| Five Point Tributary<br>Headwaters to Pinto Creek<br>15060103-885 | 2.9 mi | Copper (dissolved) (2006) |
| Pinto Creek<br>West Fork Pinto Creek to Roosevelt Lake<br>15060103-018C<br>*Also on Not Attaining (4A) List | 17.8 mi | Selenium (total) (2004) |
| Roosevelt Lake<br>15060103-1240 | 18345 a | Mercury in Fish Tissue (2006- EPA) |
| Salt River<br>Pinal Creek to Roosevelt Lake<br>15060106A-004 | 7.5 mi | Suspended sediment (2006), nitrogen, phosphorus and *E. coli* (**2010**) |
| Salt River<br>Stewart Mountain Dam to Verde River<br>15060106A-003 | 10.1 mi | Low dissolved oxygen (2004) |

| Assessment Unit | Size (acres/miles) | Cause(s) of Impairment (year first listed) |
|---|---|---|
| Tonto Creek<br>Headwaters to 341810/1110414<br>15060105-013A<br>*Also on Not Attaining (4A) List | 8.1 mi | Low dissolved oxygen (2006) |
| **San Pedro Watershed** | | |
| Brewery Gulch<br>Headwaters to Mule Gulch<br>15080301-337 | 1 mi | Copper (dissolved) (2004) |
| Mule Gulch<br>Headwaters to above Lavender Pit<br>15080301-090A | 3 mi | Copper (dissolved) (1990) |
| Mule Gulch<br>Above Lavender Pit to Bisbee WWTP discharge<br>15080301-090B | 0.8 miles | Low pH (2002- EPA), copper (dissolved) (1990) |
| Mule Gulch<br>Bisbee WWTP discharge to Highway 80 bridge<br>15080301-090C | 3.8 mi | Cadmium (dissolved), copper (total and dissolved), low pH, zinc (dissolved) (1990) |
| San Pedro River<br>Mexico border to Charleston<br>15050202-008 | 28.3 mi | *E. coli* and copper (dissolved) (**2010**) |
| San Pedro River<br>Babocomari Creek to Dragoon Wash<br>15050202-003 | 17 mi | *E. coli* (2004) |
| San Pedro River<br>Dragoon Wash to Tres Alamos Wash<br>15050202-002 | 15.5 mi | E. coli (**2010**) |
| San Pedro River<br>Aravaipa Creek to Gila River<br>15050203-001 | 14.8 mi | *E. coli* (2004) |
| **Santa Cruz Watershed** | | |
| Nogales Wash<br>Mexico border to Potrero Creek<br>15050301-011 | 6.2 mi | Ammonia (2004), chlorine (1996),<br>copper (dissolved) (2004), *E. coli* (1998) |
| Parker Canyon Lake<br>15050301-1040 | 130 | Mercury in fish tissue (2004- EPA) |
| Potrero Creek<br>Interstate 19 to Santa Cruz River<br>15050301-500B | 4.9 mi | Chlorine, low dissolved oxygen, and *E. coli* (**2010**) |
| Rose Canyon Lake<br>15050302-1260 | 7 a | Low pH (2004- EPA) |
| Santa Cruz River<br>Josephine Canyon to Tubac Bridge<br>15050301-008A | 4.8 mi | Ammonia and *E. coli* (**2010**) |
| Sonoita Creek<br>1600 feet below Patagonia WWTP discharge to Patagonia Lake<br>15050301-013C | 8.9 mi | Zinc (total) (2004), low dissolved oxygen (2006) |
| **Upper Gila Watershed** | | |
| Blue River<br>Strayhorse Creek to San Francisco River<br>15040004-025B | 25.4 mi | *E. coli* (2006) |
| Cave Creek<br>Headwaters to South Fork Cave Creek<br>15040006-852A | 7.5 mi | Selenium (total) (2004) |
| Gila River<br>New Mexico border to Bitter Creek<br>15040002-004 | 16.3 mi | *E. coli* and suspended sediment concentration (2006) |
| Gila River<br>Apache Creek to Skully Creek<br>15040002-002 | 6.4 mi | *E. coli* (**2010**) |
| Gila River | 5.8 mi | *E. coli* (2004), suspended sediment concentration |

| Assessment Unit | Size (acres/miles) | Cause(s) of Impairment (year first listed) |
|---|---|---|
| Bonita Creek to Yuma Wash<br>15040005-022 | | (2004- EPA), lead (total) (**2010**) |
| Gila River<br>Skully Creek to San Francisco River<br>15040002-001 | 15.2 mi | *E. coli* (**2010**) |
| San Francisco River<br>Blue River to Limestone Gulch<br>15040004-003 | 18.7 mi | *E. coli* (2006) |
| San Francisco River<br>Limestone Gulch to Gila River<br>15040004-001 | 12.8 mi | *E. coli* (**2010**) |
| **Verde Watershed** | | |
| East Verde River<br>From American Gulch to Verde River<br>15060203-022C | 25.8 mi | Arsenic (total) and boron (total) (2006) |
| East Verde River<br>Ellison Creek to American Gulch<br>15060203-022B | 20.3 mi | Selenium (total) (2004) |
| Granite Creek<br>Headwaters to Willow Creek<br>15060202-059A | 13.4 mi | Low dissolved oxygen (2004- EPA), *E. coli* (**2010**) |
| Miller Creek<br>Headwaters to Granite Creek<br>15060202-767 | 7.2 mi | *E. coli* (**2010**) |
| Verde River<br>Bartlett Dam to Camp Creek<br>15060203-004 | 6.6 mi | Arsenic (total) (**2010**) |
| Watson Lake<br>15060202-1590 | 150 a | Nitrogen, low dissolved oxygen, high pH (2004- EPA) |